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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,738	09/11/2003	Paul Watts	P08042US00/BAS	3454

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EXAMINER	
WONG, EDNA	
ART UNIT	**PAPER NUMBER**
1753	

DATE MAILED: 07/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/659,738	WATTS ET AL.	
	Examiner	Art Unit	
	Edna Wong	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *March 24, 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Specification

I. The abstract of the disclosure is objected to because the word "decarboxyles" in line 2 should be amended to the word -- decarboxylates --. . Correction is required. See MPEP § 608.01(b).

II. The disclosure is objected to because of the following informalities:

pages 1-9, the specification is missing a -- Brief Description of the Drawings --.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

Claims **14 and 27** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14

line 1, it appears that the "borosilicate glass" is further limiting the glass recited in

claim 12, line 2. However it is unclear if it is. If it is, then it is suggested that the word "material" be amended to the word -- glass --.

Claim 27

line 1, it appears that the "borosilicate glass" is further limiting the glass recited in claim 26, line 2. However it is unclear if it is. If it is, then it is suggested that the word "material" be amended to the word -- glass --.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

I. Claims **1-2, 5-7 and 10-11** are rejected under 35 U.S.C. 102(b) as being anticipated by **Law, Jr. et al.** (US Patent No. 6,238,543 B1).

Law, Jr. teaches a method of reacting carboxylic acids (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41] comprising:

(a) using electrodes (= an anode and a cathode) to apply an electrical voltage (= cell potential (V)) [col. 6,lines 42-44; and Figs. 3A to 5C] between opposite ends of a channel (= flow channels) [col. 4, lines 2-5; and Fig. 2C] containing a liquid (= neat organic liquids) [col. 3, lines 2-5]; and

(b) providing first and second carboxylic acid molecules (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41], each carboxylic acid molecule having a carbon atom α to a carboxylic acid group, the electrical voltage causing said carboxylic acid molecules to react together with the loss of said carboxylic acid groups and the formation of a product molecule in which a bond links said α carbon atoms together (= RCH_2-CH_2R') [col. 2, lines 11-41], said reaction taking place in the liquid in the channel and spaced from the electrodes (Fig. 1).

The electrical voltage causes electro-osmotic movement of the liquid along the channel (*inherent*).

The first and second molecules are of the same carboxylic acid (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41].

The first and second molecules are of different carboxylic acids (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41].

The reaction is repeated for a plurality of pairs of carboxylic acid molecules (= cols. 5 and 8, Examples; and Table 1], so that each pair produces a respective product molecule, the product molecules comprising stereoisomeric forms (*inherent*).

The channel is one of a plurality of interconnecting channels (Fig. 2C).

The channel is formed in an apparatus formed from two members, one of the members being provided with a groove, the groove corresponding to the channel, the other one of the members having a surface that closes the groove to form the channel (= the two cell-halves were pressed together by tie-rods placed through phenolic resin

backing plates as shown in Fig. 2C) [col. 4, lines 19-21].

Since Law, Jr. teaches all of the limitations recited in the instant claims, the reference is deemed to be anticipatory.

II. Claims **15, 18-20 and 23-24** are rejected under 35 U.S.C. 102(b) as being anticipated by **Law, Jr. et al.** (US Patent No. 6,238,543 B1).

Law, Jr. teaches a method of reacting carboxylic acids (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41] comprising:

(a) providing first and second carboxylic acid molecules (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41] in a liquid (= neat organic liquids) [col. 3, lines 2-5], in a channel (= flow channels) [col. 4, lines 2-5; and Fig. 2C], each carboxylic acid molecule having a carbon atom α to a carboxylic acid group; and

(b) applying an electrical voltage (= cell potential (V)) [col. 6,lines 42-44; and Figs. 3A to 5C] to cause electro-osmotic movement (*inherent*) of the liquid along the channel, the electrical voltage causing said carboxylic acid molecules to react together in the channel with the loss of said carboxylic acid groups and the formation of a product molecule in which a bond links said α carbon atoms together (= RCH_2-CH_2R') [col. 2, lines 11-41].

The first and second molecules are of the same carboxylic acid (= RCH_2COOH and $R'CH_2COOH$) [col. 2, lines 11-41].

The first and second molecules are of different carboxylic acids (= RCH_2COOH

and R'CH_2COOH) [col. 2, lines 11-41].

The reaction is repeated for a plurality of pairs of carboxylic acid molecules (= cols. 5 and 8, Examples; and Table 1], so that each pair produces a respective product molecule, the product molecules comprising stereoisomeric forms (*inherent*).

The channel is one of a plurality of interconnecting channels (Fig. 2C).

The channel is formed in an apparatus formed from two members, one of the members being provided with a groove, the groove corresponding to the channel, the other one of the members having a surface that closes the groove to form the channel (= the two cell-halves were pressed together by tie-rods placed through phenolic resin backing plates as shown in Fig. 2C) [col. 4, lines 19-21].

Since Law, Jr. teaches all of the limitations recited in the instant claims, the reference is deemed to be anticipatory.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

I. Claims **1-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Meresz et al.** (US Patent No. 4,006,065) in combination with **Haswell et al.** (US Patent No. 6,989,090 B2) ['090] and **Haswell, S. J.** ("Development and Operating

Characteristics of Micro Flow Injection Analysis Systems Based on Electroosmotic Flow", *Analyst* (January, 1997), Vol. 122, pp. 1R-10R).

Meresz teaches a method of reacting carboxylic acids comprising:

(a) using electrodes (= a cathode and an anode) to apply an electrical voltage (= electrolysis) between the electrodes and a liquid (= an organic solvent) [col. 2, lines 9-13]; and,

(b) providing first and second carboxylic acid molecules (= RCOOH and R'COOH) [col. 1, lines 36-68], each carboxylic acid molecule having a carbon atom α to a carboxylic acid group, the electrical voltage causing said carboxylic acid molecules to react together with the loss of said carboxylic acid groups and the formation of a product molecule in which a bond links said α carbon atoms together (= R-CH_2-CH_2-R) [col. 1, lines 36-55], said reaction taking place in the liquid and spaced from the electrodes.

The first and second molecules are of the same carboxylic acid (= R-R) [col. 1, lines 45-47].

The first and second molecules are of different carboxylic acids (= R'-R) [col. 1, lines 45-47].

The reaction is repeated for a plurality of pairs of carboxylic acid molecules (cols. 3-4, Examples 1-20; and Table 1), so that each pair produces a respective product molecule, the product molecules comprising stereoisomeric forms (= cis and trans isomers) [col. 1, lines 22-34].

The liquid is selected from the group consisting of dimethylformamide,

tetrahydrofuran, methanol, dimethyl sulfoxide, ethanol and acetonitrile (= methyl alcohol) [col. 2, lines 9-13].

The method of Meresz differs from the instant invention because Meresz does not disclose the following:

a. Wherein the electrodes are at opposite ends of a channel containing a liquid, as recited in claim 1.

b. Wherein said reaction takes place in the liquid in the channel, as recited in claim 1.

Meresz teaches forming a mixture of cis and trans geometrical isomers (col. 1, lines 22-34).

Like Meresz, Haswell '090 teaches forming a mixture of cis and trans isomers (col. 4, lines 15-16; and Fig. 3). Haswell '090 teaches forming the mixture in a micro-reactor **10** where electrodes (col. 2, lines 35-37) are at opposite ends of a channel **24', 30', 32', 34' and 36'** (= five channels) [col. 2, lines 17-20; and Figs. 1 and 2] containing a liquid. The reagents met and reacted (col. 1, lines 7-14; and col. 4, lines 32-42).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the electrodes described by Meresz with wherein the electrodes are at opposite ends of a channel containing a liquid; and wherein said reaction takes place in the liquid in the channel because an electrical current would have not been required, thermodynamically, for performance of the reaction as taught

by Haswell '090 (col. 5, line 51 to col. 6, line 2).

Furthermore, Haswell '090 teaches that forming a mixture of cis and trans isomers would not have been limited to the use of a micro-reactor having a channel geometry. Reactions may be performed and currents measured in any suitable apparatus (col. 5, lines 11-21). Thus, carrying out the method disclosed by Meresz in a micro-reactor having a channel geometry would have been functionally equivalent in forming the mixture of cis and trans isomers.

c. Wherein the electrical voltage causes electro-osmotic movement of the liquid along the channel, as recited in claim 2.

Haswell '090 teaches that the movement of reagents was caused by movement of the liquids by electroosmotic flow (col. 4, lines 41-42).

d. Wherein the channel has a maximum cross-sectional dimension in the range of from 10 to 400 μm, as recited in claim 3.

e. Wherein the maximum cross-sectional dimension is in the range from 100 to 200 μm, as recited in claim 4.

Haswell '090 teaches that the channels preferably have maximum cross-sectional dimensions in the range of 10 μm to 500 μm (col. 5, lines 19-21).

f. Wherein the channel has a length and the field strength of the electric

voltage in the channel is at least about 230 V/cm of said length, as recited in claim 8.

g. Wherein the field strength is in the range from about 230 to about 330 V/cm of the length, as recited in claim 9.

Haswell '090 teaches that the power supply **12** has four high voltage channels (V_1-V_4 in Fig. 1) which can independently supply voltages in the range of zero to ±1,000V relative to a common ground **50** (col. 2, lines 38-41).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the field strength of the electric voltage in the channel described by Haswell '090 with wherein the field strength of the electric voltage in the channel is at least about 230 V/cm of said length; and wherein the field strength is in the range from about 230 to about 330 V/cm of the length because the field strength of the electric voltage in the channel is a result-effective variable and one skilled in the art has the skill to calculate the field strength of the electric voltage in the channel that would have determined the success of the desired reaction to occur, e.g., the flow rate is dependent upon the applied voltage, the length of the channel and the electroosmotic mobility of the component (MPEP § 2141.03 and § 2144.05(II)(B)).

h. Wherein the channel is one of a plurality of interconnecting channels, as recited in claim 10.

Haswell '090 teaches that the channel is one of a plurality of interconnecting channels (col. 1, lines 50-52; and Fig. 1).

i. Wherein the channel is formed in an apparatus formed from two members, one of the members being provided with a groove, the groove corresponding to the channel, the other one of the members having a surface that closes the groove to form the channel, as recited in claim 11.

Haswell '090 teaches that the channel is formed in an apparatus formed from two members, one of the members **16** (= a base plate) being provided with a groove, the groove corresponding to the channel, the other one of the members **18** (= an upper block) having a surface that closes the groove to form the channel (col. 2, lines 12-20).

j. Wherein the channel is formed in a body formed from a material selected from the group consisting of glass, silica and quartz, as recited in claim 13.

Haswell '090 teaches that the channel is formed in a body formed from glass (col. 1, lines 42-44).

k. Wherein the material is borosilicate glass, as recited in claim 14.

Like Haswell '090, Haswell teaches a micro-reactor. Haswell teaches that Pyrex or borosilicate glass can produce a rougher surface owing to the crystalline structure of the material. Rough or poorly defined surface and intersections, of one or more channel, will increase the effect of turbulence and in turn promote dispersion, which in some instances may prove to be an advantage where mixing is required (page 3R, bridging paragraph).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the material described by Haswell '090 with wherein the material is borosilicate glass because borosilicate glass would have produced a rougher surface owing to the crystalline structure of the material. A rough or poorly defined surface and intersections, of one or more channel, would have increased the effect of turbulence and in turn promote dispersion, which in some instances may have proved to be an advantage where mixing is required as taught by Haswell (page 3R, bridging paragraph).

II. Claims **15-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Meresz et al.** (US Patent No. 4,006,065) in combination with **Haswell et al.** (US Patent No. 6,989,090 B2) ['090] and **Haswell, S. J.** ("Development and Operating Characteristics of Micro Flow Injection Analysis Systems Based on Electroosmotic Flow", *Analyst* (January, 1997), Vol. 122, pp. 1R-10R).

Meresz, Haswell '090 and Haswell are as applied for reasons as discussed above and incorporated herein.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edna Wong
Primary Examiner
Art Unit 1753

EW
July 25, 2006